Appl. No.	:	10/538699
Applicant	:	A. Van Der Beek
Filed	:	June 10, 2005
Title	:	Method And Arrangement For Monitoring The Operating Condition Of Presses, Particularly Packing Presses
Art Unit.	:	3725
Examiner	:	Nguyen, Jimmy T
Conf. No.	:	6949
Docket No.	:	METS 9295US

Mail Stop Amendment
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Communication/Petition Under 37 C.F.R. §1.10(e)

Sir:

The Office action of December 13, 2006 has been received.

Remarks/Arguments begin on page 2 of this paper.

I hereby certify that, on the date set forth below, this correspondence is being

____ transmitted via facsimile transmission to the Commissioner of Patents at Facsimile Number 571-273-8300.

____ deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450

X transmitted electronically to the United States Patent And Trademark Office's via the USPTO's EFS web site

Jonathan P. Soifer, Reg. No. 34,932

1/9/07
Date of Signature

REMARKS/ARGUMENTS

This national stage application of PCT/DE2003/004112 was filed with a preliminary amendment (copy attached as Ex. A), as set forth in the transmittal letter (copy attached as Ex. B). The preliminary amendment amended the application and claims from their form as set forth in the Translated Annex to the International Preliminary Examination Report (copy attached as Ex. C). As seen in the translations to the IPER Annex (Ex. C) and the Preliminary Amendment (Ex. A), the application had been amended to contain 9 claims. Upon receipt of the December 13, 2006 office action, Applicant's undersigned attorney noticed that 12 claims were examined.

The fact that the Examiner reviewed 12 claims was curious, because the filing receipt shows that the application contains 9 claims. In a call to the Examiner on January 5, 2007, Applicant's undersigned attorney learned that the Examiner examined the claims as set forth in the application, and not as set forth in the Preliminary Amendment. In that phone call, Applicant's undersigned attorney learned for the first time that the Examiner did not receive the Preliminary Amendment. Upon a review of the application on PAIR, Applicant's undersigned attorney first learned that the Preliminary Amendment was not part of the official record in the Patent Office.

Again, as noted on the Transmittal Letter (Ex. B), the application was filed with the Preliminary Amendment (Ex. A). The return receipt post card (Ex. D) shows that the Preliminary Amendment (Ex. A) was filed with the application, and was in fact received by

the United States Patent Office. Further, Applicant notes that the Express Mail Label No. under which the application was filed appears on each page of the Preliminary Amendment (Ex. A), on each page of the Transmittal Letter (Ex. B), on each page of the Translation to the IPER Annex (Ex. C), and on the post card (Ex. D). 37 C.F.R. §1.10(e). A true copy of the Express Mail label is attached as Exhibit E.

From the forgoing, it appears that the Patent Office did in fact receive the Preliminary Amendment (Ex. A), but that it was inadvertently separated from the rest of the application. In view of this, Applicant requests that the present office action be withdrawn; that the Preliminary Amendment (Ex. A) be entered and examined, and that a new office action be issued with respect to the claims as set forth in the Preliminary Amendment (Ex. A). 37 C.F.R. §1.10(e).

No fee is believed to be required in conjunction with this petition. You are hereby authorized to charge payment of an extension fee associated with this communication or credit any overpayment to Deposit Account No. 162201.

Respectfully Submitted,

Dated: 1/9/07

Jonathan P. Soifer, Reg. No. 34,932
Polster, Lieder, Woodruff & Lucchesi, L.C.
12412 Powerscourt Drive, Suite 200
St. Louis, Missouri 63131
Tel: (314) 238-2400
Fax: (314) 238-2401
e-mail: Jsoifer@patpro.com

Appl. No.	:	US Nat'l Phase of PCT/DE2003/004112
Applicant	:	August Van Der Beek et al.
Filed	:	
Title	:	Method And Arrangement For Monitoring The Operating Condition Of Presses, Particularly Packing Presses
Art Unit.	:	
Examiner	:	
Conf. No.	:	
Docket No.	:	METS 9295US

Mail Stop Application
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT A

Sir:

Prior to the examination of the application, please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 7 of this paper.

Remarks/Arguments begin on page 12 of this paper.

Express Mail Label No: EV 609091376 US

EXHIBIT A

Amendments to the Specification:

Please insert the following paragraphs after the title and before Line 5 of Page 1:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is the U.S. National Phase under 35 U.S.C. §371 of International Application No. PCT/DE2003/04112 having an international filing date of December 12, 2004, which, in turn, claims priority to German Application No. DE 102 58 660.8 filed December 13, 2002, both of which are incorporated herein by reference.

Please replace the paragraphs beginning at page 1, line 15, with the following rewritten paragraph:

Shear packing presses according to DE 198 04 789 are known, which substantially comprise a hopper with a cutting edge, a compactor with shearing knives guided horizontally therein, a press case arranged at right angles thereto with the compactor guided therein and a pack chamber, arranged horizontally and transversely with respect to the hopper and with ~~a~~ the compactor guided horizontally.

In practical embodiments, the hopper and the press case open into a common chamber accommodating the pack-like pressed object, the aforementioned pack chamber. The walls of the hopper, press case and pack chamber form the housing of the shear packing press. The pack chamber has an opening for the door to be displaced horizontally, through which the ejected pressed object passes. The compactor and the door are moved by hydraulic pistons/cylinders, which are connected to a hydraulic drive system.

~~To produce~~ Producing pressed objects such as packs from waste material, in particular from scrap and sheet metal wastes, by means of such known shear packing presses, includes the following steps:

- a first compaction step for the pre-compaction of the material put in to the width of the pack is carried out by means of a compactor guided horizontally in the hopper, with material possibly projecting beyond the compactor being cut off at the cutting edge by means of the shearing knife arranged on the compactor,

Please replace the paragraph beginning at page 3, line 16, with the following rewritten paragraph:

In presses, this stick-slip effect, because of the friction between the surfaces of the machine parts involved sliding on one another, is expressed by chattering and/or creaking noises. The cause of this is that, during the aforementioned relative movement, under the action of the relatively high pressures and components turning away from the actual pressing direction, the movement changes from adhesive friction to moving friction and vice versa. The acoustically perceivable oscillations which are therefore produced are in turn produced by the fact that the entire machine, in particular the machine part respectively involved, is set oscillating.

Please replace the paragraphs beginning at page 4, line 6, with the following rewritten paragraph:

By contrast, the present invention provides ~~has the object of developing~~ a method and an arrangement for monitoring the operating condition of multidirectionally

operating hydraulic presses such as packing presses, and detects damaging oscillation stresses and the stick-slip effect ~~being detected~~ in ~~good~~ sufficient time ~~and~~ to avoid "fretting" of the machine parts involved in the relative movements ~~being avoided~~.

~~According to the invention, this object is achieved by the features of claims 1 to 9.~~

Please replace the paragraph beginning at page 5, line 17, with the following rewritten paragraph:

In accordance with the ~~erection possibility~~ embodiment illustrated in fig. 2 for a hydraulic drive system 9.1 of the packing press 1, said system substantially comprises a control block 9.2, a hydraulic tank 13 and a switch cabinet 16, which form a compact structural unit which can be preassembled on its own. Linked to the switch cabinet 16 is a controller 16.2, which is connected via a connecting cable 16.4, a charge amplifier (coupler) 16.1 and a measuring line 16.3 to a sensor 2.4 on an end wall of the press case 2.2 of the packing press 1.

Please replace the paragraphs beginning at page 6, line 25, with the following rewritten paragraph:

~~These movements~~ The movement sequences of the compactors 3.1, 3.2, 3.3 and of the door 5.1, specifically with the involvement of relatively high forces, in critical positions produce the undesired stick-slip effect ~~already~~ described in more detail ~~at the beginning~~ above which, according to ~~the~~ an object of the invention, is to be detected in

~~good~~ sufficient time in order to avoid "fretting" of the machine parts involved in the movement sequences.

By means of the arrangement of the controller 16.2, which is constructionally relatively simple but surprising in its effect, with the sensor 2.4 fitted to the end wall of the press case 2.2 for measuring oscillation amplitudes, the measuring line 16.3 for passing on the measured values with a coupler, such as the charge amplifier 16.1, and a connecting cable 16.4, the method according to the invention is carried out as follows.

Please replace the paragraph beginning at page 7, line 33, with the following rewritten paragraph:

a) in a learning phase ~~phrase~~, the maximum oscillation amplitudes during the various relative movements belonging to the pressing cycle or the movement increments are recorded,

Please replace the paragraph beginning at page 8, line 12, with the following rewritten paragraph:

The idea of an incremental memory is used completely in the system for monitoring the operating condition of the packing press in order to achieve the object, namely the prevention of "fretting" of relevant machine parts, in that an "alarm" or "stop" ~~are~~ is triggered automatically when a current measured value goes beyond a tolerance value.

Please replace the paragraph beginning at page 8, line 27, with the following rewritten paragraph:

Although its effect is associated with substantially increased serviceability for the operator of machines of the generic type, the invention may be implemented ~~with~~ relatively easily ~~simple means~~, with even the retrofitting ~~according to the invention~~ of presses already in operation being unproblematic.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for monitoring the operating condition of a multidirectionally operating hydraulic press ~~such as a packing press (1)~~ for the production of pressed objects ~~such as packs~~ made from ~~waste~~ material placed in the press~~, such as scrap and sheet metal wastes~~, comprising

- at least one compacting step which can be registered by measurement in terms of both time and distance for compacting the material put in ~~in~~ a press case ~~(2.2)~~
- a step which can be registered by measurement in terms of both time and distance for ejecting the finished pack or pressed object,
- and a controller ~~(16.2)~~ for carrying out these steps by means of a drive system ~~(9.1)~~ producing a hydraulic pressure, and
- registration of amplitudes of the oscillation condition of the press and predefinition of at least one permissible oscillation amplitude as a reference value for the controller ~~(16.2)~~ of the press ~~(1)~~, ~~characterized by~~ wherein

a) registration of the amplitudes of oscillations during the time or a distance of a relative movement taking place between at least one compactor ~~(3.1, 3.2, 3.3)~~ and/or machine element such as a door ~~(5.1)~~ and the press case

~~(2.2)~~ in the cycle from the start until the end of the pressing operation, and also ejection of the pressed object and predefinition of a permissible oscillation amplitude of the entire press within the controller as a "normal condition" for time or distance increments of the relative movements,

b) measurement of the oscillation amplitudes only during the movement of at least one of the piston/cylinder unit ~~(6.1, 6.2, 6.3)~~ acted on by a hydraulic drive system ~~(9.1)~~

c) generation of an "alarm value" with a magnitude which is above the maximum value in the "normal condition", and generation of a "shut-off value" with a magnitude which is above the "alarm value",

d) automatic switch-off of the operation of the press when the "alarm value" and/or the "shut-off value" is reached

e) entry of both limiting values from "alarm value" and "shut-off value" for each relevant relative movement or for each time or distance increment of the relative movement into the controller of the press ~~(1)~~,

f) operation of the press by means of the controller ~~(16.2)~~ with indication of a signal when the "alarm value" is reached and/or the "shut-off value" is reached during the cycle from the start until the end of the pressing operation or the relevant relative movement, and

g) the use of an integrated program for the controller ~~(16.2)~~ of the press, the program comprising the steps of

g1) a learning phase with recording of the maximum oscillation amplitude during the various relative movements belonging to the pressing cycle or the relative movement increments,

g2) automatic generation of alarm and shut-off values,

g3) an active phase with registration of the measured values of the oscillation amplitudes during the pressing operation and continuous comparison with the respective alarm and shut-off values belonging to the distance or time increment,

g4) automatic triggering of appropriate actions if alarm and shut-off values are exceeded.

2. (Currently Amended) The method <u>of</u> ~~as claimed in~~ claim 1, ~~characterized in~~ <u>wherein</u> ~~that~~ the "alarm value" to be generated lies below the value of the amplitude which causes the stick-slip effect triggering fretting of the machine parts involved in the relative movement, so that no alarm is reported during fault-free operation.

3. (Currently Amended) The method <u>of</u> ~~as claimed in~~ claim 1, ~~characterized in~~ <u>wherein</u> ~~that~~ the "shut-off value" to be generated lies below the value of the

amplitude which causes the stick-slip effect triggering fretting of the machine parts involved in the relative movement.

4. (Currently Amended) The method of ~~as claimed in~~ claim 1, ~~characterized in~~ wherein ~~that~~ the amplitudes of the oscillations within the cycle of a relative movement of the machine parts involved in the pressing and ejection operation are registered while excluding non-critical oscillation amplitudes of other machine parts, and after that the values "normal condition", "alarm value" and "shut-off value" are stored in the controller ~~(16.2)~~.

5. (Currently Amended) The method as claimed in claim 1 ~~one of claims 1 to~~ 4, ~~characterized in that~~ wherein the oscillation amplitudes are measured by means of a sensor ~~(2.4)~~ fixed to an exposed point of the press case ~~(2.2)~~.

6. (Currently Amended) The method as claimed in claim 1 ~~one of claims 1 to~~ ~~5~~, ~~characterized in that~~ wherein the "alarm value" is set to be an order of magnitude ~~around~~ about 20% higher than the maximum measured value of the oscillations in the "normal condition", and the "shut-off value" is set to be an order of magnitude ~~around~~ about 40% higher than the measured value of the oscillations in the "normal condition", and are entered into the program for the control of the press ~~(16.2)~~.

7. (Currently Amended) A multidimensionally acting hydraulic packing press having a metrological arrangement for detecting and avoiding the stick-slip effect occurring in this type of presses~~, as claimed in claim 1 to 9,~~ comprising

- ~~the~~ a controller ~~(16.2)~~,
- at least one sensor ~~(2.4)~~ fitted to an exposed point of the press case ~~(2.2)~~ for measuring the oscillation amplitudes,
- a measuring line ~~(16.3)~~ for passing on the measured values with a coupler as charge amplifier ~~(16.1)~~, and
- a connecting cable.

8. (Currently Amended) The hydraulic packing press as claimed in claim 7, ~~characterized in that~~ wherein the sensor ~~(2.4)~~ is fitted to an end of the press case ~~(2.2).~~

9. (Currently Amended) The hydraulic packing press as claimed in claim 7, ~~characterized in that~~ wherein the values "normal condition", "alarm value" and "shut-off value" can be indicated on a monitor of an operator guidance system in the controller ~~(16.2)~~ of the packing press.

REMARKS/ARGUMENTS

Claims 1-9 are presently pending in the application as set forth in the Annexes to the International Preliminary Examination Report..

In this amendment, Claims 1-9 have been amended.

In this amendment, the amendments to the specification and claims has been made from the form of the specification and claims as amended through the PCT article 34 amendment, and hence, is amended from the form set forth in the Annexes to the International Preliminary Examination Report. This amendment is set forth to correct typographical and grammatical errors and to otherwise place the application, including the claims, in generally accepted US format.

Respectfully Submitted,

Dated: 6/10/05

Jonathan P. Soifer, Reg. No. 34,932
Polster, Lieder, Woodruff & Lucchesi, L.C.
12412 Powerscourt Drive, Suite 200
St. Louis, Missouri 63131
Tel: (314) 238-2400
Fax: (314) 238-2401
e-mail: Jsoifer@patpro.com

Express Mail No.: EV 609091376 US

PTO-1390 (Rev. 02-2005)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER: METS 9295US U.S. APPLICATION NO. (If known, see 37 CFR 1.5):
INTERNATIONAL APPLICATION NO.: PCT/DE2003/004112	INTERNATIONAL FILING DATE: 12 December 2003	PRIORITY DATE CLAIMED: 13 December 2002

TITLE OF INVENTION: METHOD AND ARRANGEMENT FOR MONITORING THE OPERATING CONDITION OF PRESSES, PARTICULARLY PACKING PRESSES

APPLICANT(S) FOR DO/EO/US: August Van Der Beek, Günter Bombosch, Thomas Kaprolat, Bernhard Kock

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a submission under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a submission under 35 U.S.C. 371.
3. [X] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is attached hereto (required only if not communicated by the International Bureau).
   b. [ ] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [X] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [X] An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [X] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A preliminary amendment.
14. [ ] An Application Data Sheet under 37 CFR 1.76.
15. [ ] A substitute specification.
16. [ ] A power of attorney and/or change of address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.2 and 37 CFR 1.821- 1.825.
18. [ ] A second copy of the published International Application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [X] Other items or information: International Search Report; Translation of IPER; Postcard

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is require USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 : including gathering information, preparing, and submitting the completed form to the USPTO. Time will of time you require to complete this form and/or suggestions for reducing this burden, should be sent t Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR C **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EXHIBIT B

Express Mail No.: EV609091376 US

PTO-1390 (Rev. 02-2005)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER

The following fees have been submitted	CALCULATIONS	PTO USE ONLY
21. [X] Basic national fee $300	$ 300.00	
22. [X] Examination fee If International preliminary examination report prepared by USPTO and all claims satisfy provisions of PCT Article 33(1)-(4) ..... $100 All other situations $200	$ 200.00	
23. [X] Search fee Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority ..... $100 International Search Report prepared and provided to the Office ..... $400 All other situations $500	$ 400.00	
TOTAL OF 21, 22 and 23 =	$ 900.00	
[ ] Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is $250 for each additional 50 sheets of paper or fraction thereof.		

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round up to a whole number)	RATE	
- 100 =	/50 =		x $250	$

Surcharge of $130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(h)).	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	9 - 20 =	0	x $50	$ 0	
Independent claims	2 - 3 =	0	x $200	$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $360	$	
			TOTAL OF ABOVE CALCULATIONS =	$ 900.00	
[ ] Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by ½.					
			SUBTOTAL =	$	
Processing fee of $130.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)). +				$	
			TOTAL NATIONAL FEE =	$ 900.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$ 40.00	
			TOTAL FEES ENCLOSED =	$ 940.00	
			Amount to be refunded:	$	
			Amount to be charged:	$	

a. [X] A check in the amount of $ 940.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 162201. A duplicate copy of this sheet is enclosed.

d. [ ] Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

SEND ALL CORRESPONDENCE TO:

SIGNATURE

Jonathan P. Soifer
NAME

34,932
REGISTRATION NUMBER

Method and arrangement for monitoring the operating condition of multidirectionally acting hydraulic presses, such as packing presses

Technical field

The invention relates to a method and an arrangement for monitoring the operating condition of multidirectionally acting hydraulic presses such as packing presses for the production of pressed objects such as from scrap and sheet metal wastes.

Prior art

Shear packing presses according to DE 198 04 789 are known, which substantially comprise a hopper with cutting edge, compactor with shearing knives guided horizontally therein, a press case arranged at right angles thereto with compactor guided therein and a pack chamber, arranged horizontally and transversely with respect to the hopper and with a compactor guided horizontally.

In practical embodiments, hopper and press case open into a common chamber accommodating the pack-like pressed object, the aforementioned pack chamber. The walls of the hopper, press case and pack chamber form the housing of the shear packing press. The pack chamber has an opening for the door to be displaced horizontally, through which the ejected pressed object passes. The compactor and the door are moved by hydraulic pistons/cylinders, which are connected to a hydraulic drive system.

EXHIBIT C

To produce pressed objects such as packs from waste material, in particular from scrap and sheet metal wastes, by means of such known shear packing presses

- a first compaction step for the pre-compaction of the material put in to the width of the pack is carried out by means of a compactor guided horizontally in the hopper, material possibly projecting beyond the compactor being cut off at the cutting edge by means of the shearing knife arranged on the compactor,

- after that, a second compaction step for the intermediate compaction of the material pre-compacted to the pack width to the height of the pack is carried out by means of the compactor guided in the press case at right angles to the hopper,

- then, a third compaction step for the final compaction of the material to the final density and length of the pack is carried out by means of the compactor guided horizontally in the pack chamber, horizontally and transversely with respect to the hopper, the finished pack, after reaching the final density and length, being ejected from the pack chamber through the door, and

- finally, the control of these compaction steps is carried out by means of a drive system producing a hydraulic pressure.

This basic principle has proven worthwhile in practice but there is a requirement for functional improvements

with regard to monitoring the operating condition of presses.

In this case, presses are not just understood to mean the type mentioned at the beginning. In the sense of the invention, the requirement for an improvement in the monitoring of the operating condition extends only as far as presses, i.e. machines, in which, because of the relative movement between a driven compactor and a press case or table absorbing the compaction pressure for the pressed object, what is known as a stick-slip effect occurs. This applies both to presses that act two-dimensionally and also three-dimensionally (specifically of the type mentioned at the beginning).

In presses, this stick-slip effect because of the friction between the surfaces of the machine parts involved sliding on one another is expressed by chattering and/or creaking noises. The cause of this is that, during the aforementioned relative movement, under the action of the relatively high pressures and components turning away from the actual pressing direction, the movement changes from adhesive friction to moving friction and vice versa. The acoustically perceivable oscillations which are therefore produced are in turn produced by the fact that the entire machine, in particular the machine part respectively involved, is set oscillating.

In the extreme case, as a result of a high-frequency frictional movement, the frictional surface respectively involved can weld locally, which is generally designated "fretting". For the machine, this means considerable damage, which can be rectified only with considerable effort. Furthermore, a loss of

production arises for the operator, which leads to consequential damages.

Summary of the invention

By contrast, the invention has the object of developing a method and an arrangement for monitoring the operating condition of multidirectionally operating hydraulic presses such as packing presses, damaging oscillation stresses and the stick-slip effect being detected in good time and "fretting" of the machine parts involved in the relative movements being avoided.

According to the invention, this object is achieved by the features of claims 1 to 9.

Brief description of the drawings

In the drawings:

fig. 1 shows the schematically illustrated arrangement according to the invention using the example of a packing press, in a perspective illustration,

fig. 2 shows a plan view with a schematically illustrated arrangement according to the invention.

Best way of implementing the invention

The invention will be explained in terms of its basic arrangement and the active principle on a packing press operating three-dimensionally, which specifically has to implement different movement sequences and conditions than those of a forging press, for example, in accordance with the following exemplary embodiment.

According to fig. 1, the packing press 1 substantially comprises a press case 2.2 and a pack chamber 2.3, and a first compactor 3.1 driven by a first piston/cylinder unit 6.1, and a second compactor 3.2 driven by a second piston/cylinder unit 6.2 and a third compactor 3.3 driven by a third piston/cylinder unit 6.3. A door 5.1 connected to a fourth piston/cylinder unit 6.4 is guided in a door case 5.2 such that it can be moved horizontally. The door case 5.2 is fixed to the housing part of the pack chamber 2.3 by means of a tie rod 10, the tie rod 10 at the same time absorbing the pressure against the door 5.1 exerted on a pressed object, not illustrated, by the third piston/cylinder unit 6.3 by means of the third compactor 3.3.

In accordance with the erection possibility illustrated in fig. 2 for a hydraulic drive system 9.1 of the packing press 1, said system substantially comprises a control block 9.2, a hydraulic tank 13 and a switch cabinet 16, which form a compact structural unit which can be preassembled on its own. Linked to the switch cabinet 16 is a controller 16.2, which is connected via a connecting cable 16.4, a charge amplifier (coupler) 16.1 and a measuring line 16.3 to a sensor 2.4 on an end wall of the press case 2.2 of the packing press 1.

The following basic series of steps or sequences and combinations are typical of the operation of the packing press 1:

- the pre-compaction of the material by means of the first compactor 3.1 in the first compaction step,

- the following second compaction step by means of the second compactor 3.2,

- the third compaction step, carried out by means of the third compactor 3.3, in which the first compactor 3.1 is already in a position exposing the opening of the pack chamber 2.3.

In this case, the return strokes of the compactors 3.1, 3.3 can be coupled, the compactor 3.3 then initially covering part of the distance on its own and the remainder of the distance together with the compactor 3.1.

The door 5.1 is closed at the same time as the return stroke of the third compactor 3.3 by means of hydraulic isolation, or opened at the same time as the return stroke of the compactor 3.2 by means of hydraulic isolation.

For all these sequences, use is made of a controller 16.2, which monitors the movement sequences of the compactors 3.1, 3.2, 3.3 and the door 5.1 during the cycles for the production of the pressed object, not illustrated.

These movements sequences of the compactors 3.1, 3.2, 3.3 and of the door 5.1, specifically with the involvement of relatively high forces, in critical positions produce the undesired stick-slip effect already described in more detail at the beginning which, according to the object, is to be detected in good time in order to avoid "fretting" of the machine parts involved in the movement sequences.

By means of the arrangement of the controller 16.2, which is constructionally relatively simple but surprising in its effect, with the sensor 2.4 fitted to

the end wall of the press case 2.2 for measuring oscillation amplitudes, the measuring line 16.3 for passing on the measured values with a coupler as charge amplifier 16.1 and a connecting cable 16.4, the method according to the invention is carried out as follows.

Relative movements taking place during the time and/or distance between each compactor 3.1, 3.2, 3.3 and the press case 2.2 and also the door 5.1 in the cycle from the start until the end of the pressing operation and the ejection of the pressed object, not illustrated, the oscillation amplitudes are registered continuously via the sensor 2.4. After that, a permissible oscillation amplitude for the packing press 1 is registered within the controller 16.2 as a "normal condition" for the time and/or distance increments of the relative movements.

Then, an "alarm value" with a magnitude 20% higher than the maximum measured value of the oscillations in the normal condition is generated, and a "shut-off value" having a magnitude 40% higher than the previous maximum measured value is generated and the two limiting values are entered into the controller 16.2 of the press 1 for each time and/or distance increment, with the effect of an incremental memory.

The operation of the press is ultimately managed, inventively completing the series of steps according to the method, by the use of a program integrated into the controller 16.2, in such a way that

a) in a learning phrase, the maximum oscillation amplitudes during the various relative movements belonging to the pressing cycle or the movement increments are recorded,

b) automatic generation of the "alarm" and "shut-off values" is carried out,

c) in the actual active phase, the measured values of the oscillation amplitudes during the pressing operation are registered and compared continuously with the respective associated "alarm and shut-off values" belonging to the distance and/or time increment,

d) appropriate actions are triggered automatically if the values are exceeded.

The idea of an incremental memory is used completely in the system for monitoring the operating condition of the packing press in order to achieve the object, namely the prevention of "fretting" of relevant machine parts, in that "alarm" or "stop" are triggered automatically when a current measured value goes beyond a tolerance value.

It is expedient to indicate the values "normal condition", "alarm value" and "shut-off value" on a monitor, not designated, of an operator guidance system in the controller 16.2 of the packing press 1.

Commercial applicability

Although its effect is associated with substantially increased serviceability for the operator of machines of the generic type, the invention may be implemented with relatively simple means, even retrofitting according to the invention of presses already in operation being unproblematic.

Patent claims

1. A method for monitoring the operating condition of a multidirectionally operating hydraulic press such as a packing press (1) for the production of pressed objects such as packs made from waste material, such as scrap and sheet metal wastes, comprising

- at least one step which can be registered by measurement in terms of both time and distance for compacting the material put in in a press case (2.2)

- a step which can be registered by measurement in terms of both time and distance for ejecting the finished pack or pressed object,

- and a controller (16.2) for carrying out these steps by means of a drive system (9.1) producing a hydraulic pressure, and

- registration of amplitudes of the oscillation condition of the press and predefinition of at least one permissible oscillation amplitude as a reference value for the controller (16.2) of the press (1), **characterized by**

a) registration of the amplitudes of oscillations during the time or a distance of a relative movement taking place between at least one compactor (3.1, 3.2, 3.3) and/or machine element such as a door (5.1) and the press case (2.2) in the cycle from the start until the end of the pressing operation, and also ejection of the pressed object and predefinition of a

permissible oscillation amplitude of the entire press within the controller as a "normal condition" for time or distance increments of the relative movements,

b) measurement of the oscillation amplitudes only during the movement of at least one of the piston/cylinder unit (6.1, 6.2, 6.3) acted on by a hydraulic drive system (9.1)

c) generation of an "alarm value" with a magnitude which is above the maximum value in the "normal condition", and generation of a "shut-off value" with a magnitude which is above the "alarm value",

d) automatic switch-off of the operation of the press when the "alarm value" and/or the "shut-off value" is reached

e) entry of both limiting values from "alarm value" and "shut-off value" for each relevant relative movement or for each time or distance increment of the relative movement into the controller of the press (1),

f) operation of the press by means of the controller (16.2) with indication of a signal when the "alarm value" is reached and/or the "shut-off value" is reached during the cycle from the start until the end of the pressing operation or the relevant relative movement, and

g) the use of an integrated program for the controller (16.2) of the press, the program comprising the steps of

g1) a learning phase with recording of the maximum oscillation amplitude during the various relative movements belonging to the pressing cycle or the relative movement increments,

g2) automatic generation of alarm and shut-off values,

g3) an active phase with registration of the measured values of the oscillation amplitudes during the pressing operation and continuous comparison with the respective alarm and shut-off values belonging to the distance or time increment,

g4) automatic triggering of appropriate actions if alarm and shut-off values are exceeded.

2. The method as claimed in claim 1, characterized in that the "alarm value" to be generated lies below the value of the amplitude which causes the stick-slip effect triggering fretting of the machine parts involved in the relative movement, so that no alarm is reported during fault-free operation.

3. The method as claimed in claim 1, characterized in that the "shut-off value" to be generated lies below the value of the amplitude which causes the

stick-slip effect triggering fretting of the machine parts involved in the relative movement.

4. The method as claimed in claim 1, characterized in that the amplitudes of the oscillations within the cycle of a relative movement of the machine parts involved in the pressing and ejection operation are registered while excluding non-critical oscillation amplitudes of other machine parts, and after that the values "normal condition", "alarm value" and "shut-off value" are stored in the controller (16.2).

5. The method as claimed in one of claims 1 to 4, characterized in that the oscillation amplitudes are measured by means of a sensor (2.4) fixed to an exposed point of the press case (2.2).

6. The method as claimed in one of claims 1 to 5, characterized in that the "alarm value" is set to be an order of magnitude around 20% higher than the maximum measured value of the oscillations in the "normal condition", and the "shut-off value" is set to be an order of magnitude around 40% higher than the measured value of the oscillations in the "normal condition", and are entered into the program for the control of the press (16.2).

7. A multidimensionally acting hydraulic packing press having a metrological arrangement for detecting and avoiding the stick-slip effect occurring in this type of presses, as claimed in claim 1 to 9, comprising

- the controller (16.2),

- at least one sensor (2.4) fitted to an exposed point of the press case (2.2) for measuring the oscillation amplitudes,

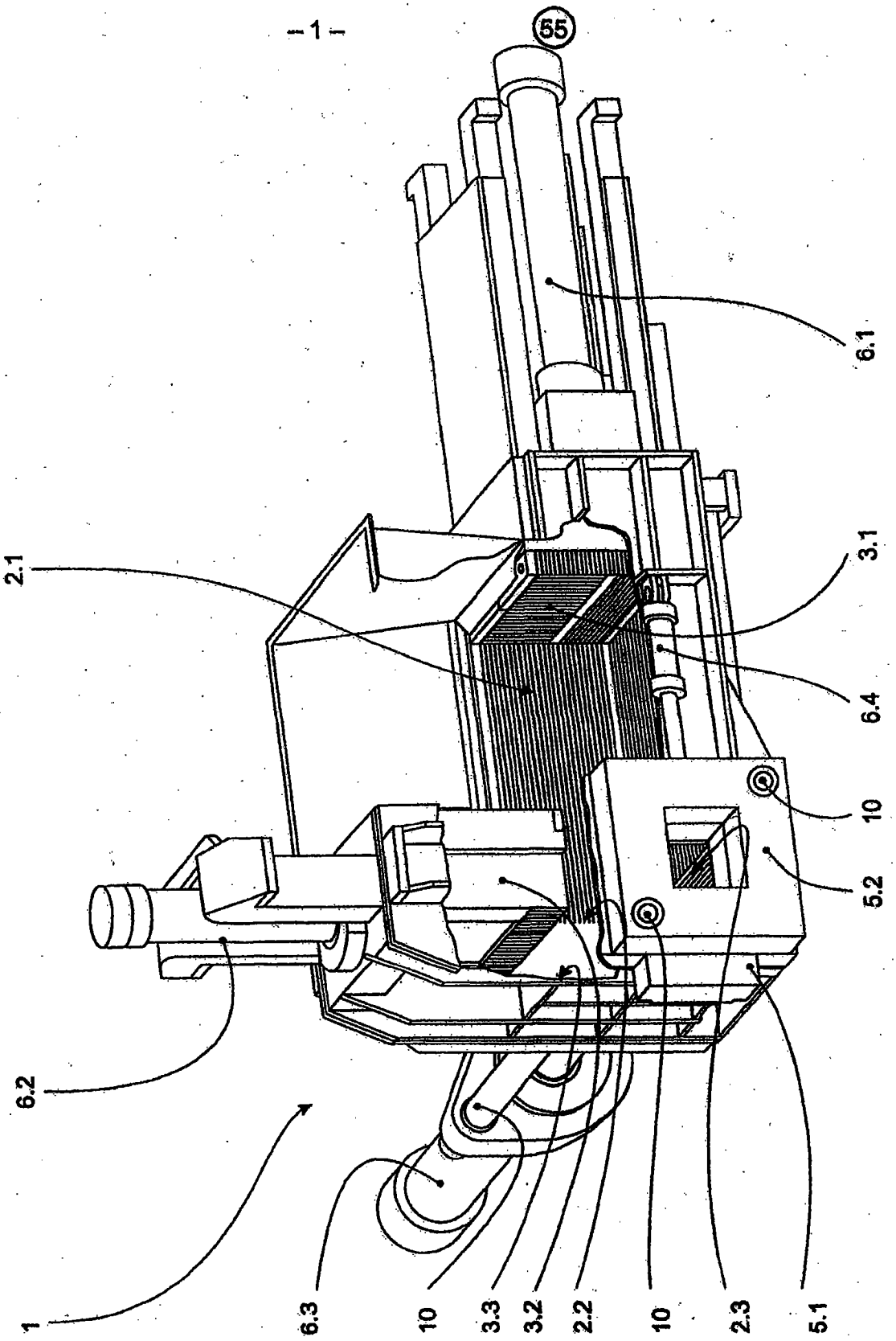
- a measuring line (16.3) for passing on the measured values with a coupler as charge amplifier (16.1), and

- a connecting cable.

8. The hydraulic packing press as claimed in claim 7, characterized in that the sensor (2.4) is fitted to an end of the press case (2.2).

9. The hydraulic packing press as claimed in claim 7, characterized in that the values "normal condition", "alarm value" and "shut-off value" can be indicated on a monitor of an operator guidance system in the controller (16.2) of the packing press.

Fig. 1



Kindly acknowledge receipt hereon a Non-Provisional Patent Application, including the transmittal Letter cover sheet, a copy of the International Appln. as filed, an English language translation of same, a properly executed Declaration and Power of Attorney, an English translation of IPER Annexes, an Assignment of the invention to Metso Lindemann GMBH, a Preliminary amendment, an International Search Report, a translation of IPER, and a return receipt Postcard, for August Van der beek, et al. (METHOD AND ARRANGEMENT FOR MONITORING THE OPERATING CONDITION OF PRESSES, PARTICULARLY PACKING PRESSES). Also enclosed is a check in the amount of $940.00 ($900.00/appln. filing fee - $40.00/assign. filing fee).

June 10, 2005 (vrl)

JPS/METS 9295US

Express Mail No.: EV 609091376 US

10/538699

JC02 Rec'd PCT/PTO 10 JUN 2005

EXHIBIT D

Customer Copy
Label 11-B, April 2004

EV 609091376 US

EXPRESS MAIL
UNITED STATES POSTAL SERVICE®

Post Office To Addressee

ORIGIN (POSTAL SERVICE USE ONLY)

PO ZIP Code: 63029
Date Accepted: 6/10/05 (Mo. Day Year)
Time Accepted: 5:06 ☐ AM ☒ PM
Flat Rate ☐ or Weight: lbs. 14 ozs.
Day of Delivery: ☐ Next ☐ 2nd ☐ 2nd Del. Day
Scheduled Date of Delivery: Month 6 Day 11/13
Scheduled Time of Delivery: ☒ Noon ☐ 3 PM
Military
☐ 2nd Day ☐ 3rd Day
Int'l Alpha Country Code
Postage: $
Return Receipt Fee: $
COD Fee: $
Insurance Fee: $
Total Postage & Fees: $
Acceptance Emp. Initials: BB

DELIVERY (POSTAL USE ONLY)

Delivery Attempt: Mo. Day Time ☐ AM ☐ PM Employee Signature
Delivery Attempt: Mo. Day Time ☐ AM ☐ PM Employee Signature
Delivery Date: Mo. Day Time ☐ AM ☐ PM Employee Signature
☐ WAVER OF SIGNATURE (Parcel Post Only)
NO DELIVERY: ☐ Weekend ☐ Holiday

CUSTOMER USE ONLY
METHOD OF PAYMENT:
Express Mail Corporate Acct. No.: 314 238 2400
Federal Agency Acct. No. or Postal Service Acct. No.:

FROM: (PLEASE PRINT) PHONE ( )
Jonathan P. Soifer
POLSTER LIEDER WOODRUFF
& LUCCHESI
12412 POWERSCOURT DR STE 200
SAINT LOUIS MO 63131-3615

METS 9295US

TO: (PLEASE PRINT) PHONE (703 305 8600)
MAIL STOP
COMMISSIONER FOR PATENTS
PO BOX 1450
ALEXANDRIA VA 22313-1450

FOR PICKUP OR TRACKING: Visit www.usps.com or Call 1-800-222-1811

EMS

EXHIBIT E